

which are slowly developing into profound neuroses. The sudden changes of fortune, the immense difficulties to be overcome, the confusion consequent upon changed commercial conditions, have made the middle aged old and have tried to the utmost the reserve strength of the younger generation. The improvised cook stoves, the darkened house and even tenting on the camp ground lost their novelty and added to the depressing influence of the surrounding desolation. Upon the aged, the nervously weak, the millionaire reduced to the ranks, and on the hardworking citizen, who with those dependent on him, suddenly facing poverty, the effect has been more lasting. It is impossible to tabulate or to so reduce these facts as to have statistical value, yet it certainly is proving a serious factor, and it is possible that more nervous breakdowns will be attributed to 1907, than has been tabulated for the year 1906.

I find many men no longer equal to their old burdens, apparently not able to keep the pace they once set and resorting to alcohol to stimulate their flagging energies—unequal to the strenuous life.

While the days following the earthquake tried the nerves of the strongest with its pitiful scenes, its demands on even the weakest and its real suffering on all, it was not an unmixed evil. We who are a part of its active life see much to gratify our civic pride. A new city free from the blight of the old Chinatown, Tar Flat and the Barbary Coast, certainly freed from the old bubonic taint; cleaner, better built and morally regenerated. We shall remember with pleasure the self-sacrifice, heroism and true humanity that characterized the darkest days, and will have no shame when our own part in this time of trouble becomes a part of medical history. Certain it is that the disaster was bravely borne and that misfortune cemented the many conflicting elements into one solid phalanx working for the public good, forgetful of individual intents in the attempt to safeguard the homeless and helpless.

ANALYSIS OF THE STOMACH CONTENTS; INDICATIONS, FAULTY METHODS AND WRONG INTERPRETATIONS.*

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In what cases is it necessary to have the stomach contents examined? Manifestly in all those with symptoms referred to the stomach which are not improved after a few weeks of treatment, dietetic and medicinal, prescribed at a venture. The phrase, "at a venture," is used advisedly, for the aberrations of secretion which play so large a role in the diseases of the digestive system cannot be diagnosed with any approach to certainty from the symptoms alone; and the motor derangements also are most accurately measured by taking up the gastric contents at certain intervals after a test meal.

Symptoms referred to the intestines call for a study of the gastric chemistry and motility quite as much as those which seem to involve the stomach only. Even when a disturbed bowel function is primary, as in constipation with secondary stomach trouble, it is most important to learn in just what way and to what extent the stomach is implicated to insure a proper choice of remedies. But when a diarrhea is directly dependent upon a deficiency of the gastric juice, or perhaps, upon an old neglected gastric catarrh which has gradually progressed downward, how are we to cure it by giving opiates and astringents or any other drugs while in ignorance of the cause? Equally impossible is it, as a rule, to overcome permanently a constipation which has resulted from any of the forms of hyperacidity, without having first discovered and remedied the fault in the stomach.

It is presupposed that in every case of chronic illness, especially in women, there has been an exploration of the abdomen externally to exclude displacement, dilatation, etc; then, when in the absence of any such faults or after correcting them, if present, there are gastric symptoms such as pain, eructations, vomiting, flatulent distention, etc., which do not yield to diet and a cautious experimenting with drugs, the test meal and an analysis of the gastric contents should follow. This helps much in deciding whether we are dealing with ulcer, cancer, catarrh, or a pure neurosis.

And not alone in cases in which there are obvious gastrointestinal symptoms, are analyses of the gastric contents often required. It is exceedingly common to meet with serious forms of disease in some part of the digestive system without any inconvenience having been complained of in the organ actually affected. Careful clinicians who make it a rule to examine the abdominal organs in all doubtful chronic cases, often encounter headaches, insomnia, neurasthenia, a variety of skin diseases, etc., which do not yield until some such obscure gastric, hepatic or intestinal trouble has been sought out and remedied. In illustration of this point brief mention is here made of one interesting case:

Early last January a dentist came to me from Chicago with insomnia and the worst eczema of the face I had ever seen. This had existed eight years and been ineffectually treated by numerous physicians, including the author of one of our leading works on dermatology. The patient had considered his digestion and bowels normal, but I found hypoauidity, much butyric acid fermentation and a relaxed pylorus, which allowed a mass of sour, undigested food to be propelled into the duodenum prematurely. In consequence there were offensive bowel movements inclined to be loose; also atony of the colon with too long retention of the feces, though the bowels moved usually at least twice a day. A moderate restriction of the diet and the administration of a small dose of castor oil at bed time with ten grains of sodium benzoate three times a day, in addition to the appropriate local measures and regular out-door exercise, were followed by a clearing up of the face and a return of

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sound sleep by the end of three weeks. The patient has remained practically free of eczema, except some threatenings of a relapse, due to imprudence in diet, and now regularly enjoys plenty of refreshing sleep.

Faulty methods: If we may judge by numerous contributions to medical journals, absolutely unreliable methods of testing the stomach contents, are largely employed. It should be manifest that in making quantitative determinations of the hydrochloric acid, we require a reagent which will not give its characteristic reaction with anything else likely to be present in the stomach. An indicator that will respond not only to HCl, but also to several of the organic or fermentation acids in such quantities as may be found in the stomach, is clearly not trustworthy. Congo red, for example, will react to even very small amounts of almost any kind of free acid, organic as well as mineral, and yet we frequently see it mentioned in medical papers as a test especially for free HCl.

Tropeolin OO is another unreliable agent which is employed in some quarters as an indicator in making the same test; and one writer has strongly insisted that it is the best of all such indicators, while at the same time condemning as untrustworthy dimethyl-amido-azo-benzol, which is the one now in most general use for the purpose. To help settle this question, I carried out a series of experiments recently in my laboratory in Philadelphia, with various dilutions of hydrochloric acid and of the different organic acids likely to be in the stomach, and also, with the help of my assistants, analyzed thirty-five specimens of stomach contents, each by three different methods—that of Mintz, with Guentzburg's reagent, of Toepfer, with dimethyl, etc., and by titration with tropeolin OO. Still more recently since coming to Los Angeles, I have made a number of additional observations in the same line. The results of these experiments and observations are here summarized. They show, in agreement with the findings of most other observers, that phloroglucin-vanillin (Guentzburg's reagent) will react to mineral acids only and HCl being the only such acid to be found in the free form in the stomach, unless when some of the others are taken into it as medicine or otherwise, it affords an accurate measure of the quantity of that acid present in the gastric contents. By means of this reagent, I have been able to recognize it when diluted to the extent of one part of the official chemically pure hydrochloric acid in upwards of 30,000 parts of distilled water.

Aqueous dilutions of the same acid were next tested with both dimethyl, etc., and tropeolin OO as indicators and, comparing one with the other, they proved to be about equally sensitive to it, both responding to a dilution of one part in 20,000, though the color change was a little more marked at this dilution when the dimethyl, etc., was used.

Tests were also made of the comparative sensitiveness of these two reagents to solutions in water of the free organic acids which may occur in the stomach. Tropeolin OO proved to be more sen-

sitive to most of these than dimethyl, etc., and, therefore, would be likely to be less trustworthy as a means of measuring the proportion of free HCl when mixed with organic acids in the gastric contents.

Dimethyl-amido-azo-benzol was shown by these experiments to be quite sensitive to lactic acid, reacting to one part of it in 750, but very little so to the other organic acids in aqueous solution. In the tests, however, of numerous specimens of stomach contents, this reagent as compared with Guentzburg's gave almost uniformly somewhat higher figures and in the case of those showing by their odor much fermentation, the difference was so marked as to make the results of the former very misleading. Hence, since completing these investigations, I have made it a rule in important cases, including generally the first analysis and especially in examining gastric contents, the odor of which points to excessive fermentation, as well as those in which there is a suspicion of cancer with much lactic acid (which has no marked odor), to confirm the findings as to free HCl, by making also the quantitative test with the Guentzburg reagent. This takes much more time, but the results can then be depended on.

Tropeolin OO, on the other hand, while it proved extremely sensitive to the organic acids in aqueous solution, and also to a like solution of free HCl, gave abnormally low values for the latter in actual tests of gastric contents. In two, only, of the thirty-five analyses did it give values for that acid as high as the Guentzburg reagent. In fifteen of them in which the same acid was shown to be present by the accurate Mintz method, none or a trace only was found with tropeolin as the indicator. The latter is thus proved to be utterly valueless as a test for free HCl. Experiments are lacking to show why it responds so differently to aqueous solutions of the free acids and the same when mixed with the gastric contents. It is likely that the albumen and peptones in the latter interfere in some way with the reaction.

Wrong Interpretations: Attempting to judge of the gastric secretion by the results obtained from a mere qualitative test for free HCl, or from this and a quantitative determination of the total acidity alone, is not only depending upon a faulty method, but also involves a wrong, or at the best, a doubtful, interpretation. Such meager data do not warrant any conclusions upon which a diagnosis could be surely based, though they give partial information which may be helpful at times. A positive reaction for free HCl, even with a correct method, may occur when there is a marked deficiency of that acid in the aggregate, with only a minute amount of it present in the free form; and at the same time the combined HCl might be abnormally low. Or with the same findings there might be a marked hyper-chlorhydria and, as is usual with this condition, a relatively small amount of the combined HCl, showing the proportion of proteids peptonized to be deficient—less than often happens when the free HCl is low.

On the other hand, the failure to find any free

HCl, may be by itself of little moment; for there is sometimes an extra large proportion of it combined with the proteids of the food, which could only be certainly shown by the quantitative test for combined HCl. This can happen especially when the specimen tested is taken up some hours after a dinner or other heavy meal. The total acidity would throw additional light on the problem for one accustomed to interpreting the results of gastric analyses, but it would be impossible for even the most expert to know just how much of the total acidity might represent combined chlorides of the food bases and how much of it organic acids and their products, unless special extra examinations were made to determine separately the amounts of these.

Just as I had finished writing the foregoing part of this paper, a gentleman called to consult me on account of a stubborn chronic constipation. Examination revealed, besides atony of the colon, a large area of infiltration in the right lung, locomotor ataxia, enlarged prostate gland, enlarged liver with a suspiciously tender gall-bladder and movable right kidney. The analysis of his stomach contents nearly three hours after a hearty mixed meal, gave as the principal findings, an entire absence of free HCl and a low total acidity—only 56—but on the other hand, the combined HCl was comparatively high—28—only a little below the normal figure for such a meal. Here the work of peptonization was comparatively good and very little of the total acidity represented organic acids. The next patient, seen the same morning, had flatulence, constipation and catarrh of both stomach and bowels. Four hours after a similar breakfast his gastric contents showed by the Guentzburg test, free HCl 38, combined HCl 16 and T. A. 60. Here the free HCl was somewhat high, the T. A. too low and the combined HCl also proportionately low, showing a comparatively poor peptonization. Both these are to be classed as cases of hypoauidity, the secretion in the latter being much more deficient than in the former, notwithstanding that there was no free HCl in the former and at least a full amount in the latter.

Thus, when quantitative determinations of both the free and combined HCl are made as well as of the total acidity, the most important factors of the problem are given, so that one with a fairly good knowledge of such work, can judge as to the secretory activity of the stomach. But without having these three factors known, a correct interpretation of the findings is often impossible.

There are other tests, also, such as those for the rennet ferment pepsin, the changes in the starch of the food, etc., which often afford additional information of value. But one not somewhat familiar with these chemical processes might well be puzzled over even full reports of such cases as the two mentioned.

The contents taken up three to four hours after a hearty mixed meal, such as a dinner or ordinary American breakfast, are capable of furnishing even more information than those obtained after the

usual Ewald test breakfast, and at the same time, are still more liable to be wrongly interpreted. During the longer period any tendency to fermentation has had much more time to develop organic acidity with the tell-tale odors accompanying it. Any deficiency in peptonization will be markedly more apparent and the aggregate of the hydrochloric acid secreted, which may be learned by adding together the figures representing the free and the combined HCl, will indicate in a striking way any variation on either side from the normal secretory work of the organ. The sum of these two sets of figures should not be very greatly less, in a perfectly healthy patient, than the total acidity, the difference representing the organic acids and their salts. It should be borne in mind that the longer the food remains in the stomach, the higher normally are the values for all the elements, especially for the total acidity and combined HCl. That for the free HCl may be decreased, while the figures representing the combined HCl are proportionately increased.

Evidently, then, it is desirable when possible to introduce the tube and obtain enough stomach contents to make a number of the more important tests without which the conclusions must be liable to mislead. The ingenious devices by means of which a few drops of the gastric contents are obtained for one or two partial tests, should be regarded as makeshifts only. They are but little more satisfactory than the external method of determining approximately the amount of free acid in the stomach which has been described by me elsewhere. These easy methods are only to be recommended when it is quite impossible to obtain the necessary amount of the gastric contents for a reasonably complete analysis. To establish a diagnosis of real value in any doubtful case, not only must there be such an analysis carried out by means of reagents and methods which are unequivocal, but there needs to be also an intelligent interpretation of the findings so that they may become the basis of a proper treatment.

MEDICAL ORGANIZATIONS AND PUBLIC HEALTH WORK, WITH A SPECIAL APPLICATION TO THE MILK PROBLEM OF CALIFORNIA CITIES.

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I. THE PURE MILK QUESTION.

Several months ago, the Los Angeles County Medical Association appointed a Pure Food Committee, which committee, as its name would imply, was to endeavor to bring into being measures whereby only pure foods would be offered for sale in the community.

The first work taken up was that of pure milk. The intimate relationship between infant mortality and an impure milk supply is too well known to need repetition before this Society. It may safely be taken for granted that we are all agreed that if we could prevent the sale of impure milk, many lives